DOCUMENT RESUME

ED 062 391 TM 001 329

AUTHOR Brehman, George E., Jr.
TITLE Attitude Toward School Learning: The Development of a Seventh Grade Level Instrument for Measurement of Goal IV of the Pennsylvania Educational Quality Assessment Program.
INSTITUTION Pennsylvania State Dept. of Education, Harrisburg.
PUB DATE Apr 72
NOTE 21p.; Paper presented at the annual meeting of the American Educational Research Association (Chicago, Ill., April 1972)

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS *Attitude Tests; Educational Accountability; Educational Improvement; Factor Analysis; Factor Structure; *Grade 5; *Grade 11; Item Analysis; Learning Experience; Learning Processes; *Program Evaluation; Public Schools; State Programs; Student Attitudes; Student Experience; *Test Construction; Testing; Test Reliability; Test Validity

ABSTRACT

The objectives of this study were twofold: first, to develop an improved version of the instruments used to measure Goal IV (Attitude Toward School and School Learning) at the fifth and eleventh grade levels in the public schools of Pennsylvania under a program of "Educational Quality Assessment" mandated by the legislature. Secondly, it was the object of this study to develop items that would measure attitudes toward learning that are independent of school context. (Author/CK)

ED 062391

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
OFFICE OF EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY

ATTITUDE TOWARD SCHOOL LEARNING: THE DEVELOPMENT OF A SEVENTH GRADE LEVEL INSTRUMENT FOR MEASUREMENT OF GOAL IV OF THE PENNSYLVANIA EDUCATIONAL QUALITY ASSESSMENT PROGRAM

George E. Brehman, Jr.
Research Associate

TM 001 329

Bureau of Educational Research
Pennsylvania Department of Education

February 1972

(Paper to be presented at annual meeting of the American Educational Research Association, April 1972)

Abstract

The objectives of this study were twofold. First, to develop an improved version of the instruments used to measure Goal IV (Attitude Toward School and School Learning) at the fifth and eleventh grade levels in the public schools of Pennsylvania under a program of "Educational Quality Assessment" mandated by the legislature. This mandate states that "Quality Education should help every child acquire a positive attitude toward the learning process" and, in general, this was construed as meaning that quality education should encourage pupils to display positive attitudes toward school assignments and toward the general school climate, e.g., that pupils should express an interest in and desire to graduate from high school, should express the opinion that learning does not end where formal education ends, and should express the desire to return to some type of educational setting from time to time as adults.

Secondly, it was the object of this study to develop items that would measure attitudes toward learning that are independent of school context, since they could be construed as reflecting a general openness to experience or intrinsic love of learning which may not correspond closely with attitudes toward school and schooling but which might well be influenced by the school as well as the home.

The method used was one of first examining the currently existing Goal IV items for the fifth and sixth grade as to factor structure and then deliberately attempting to write, or adapt from other sources, items that were likely to measure the same factors. Secondly, items were devised or adapted from other sources that seemed likely to measure a general positive attitude toward learning outside of a school context.

The resulting experimental items were too numerous to put into a single form and were therefore placed into five separate forms with items of known factor structure (based on previous research on Goal IV) being common to all five instruments.

The five instruments were then administered to 750 seventh-grade students in two comparable junior high schools in a major Pennsylvania city with about 170 pupils per form. The sample comprised approximately 90 per cent of all seventh graders in these two schools and, in general, represented a good mix of ability and socioeconomic background but with relatively few extremes. The results were then analyzed by use of Likert Analysis to identify items that discriminated significantly with regard to the total score. A Cronbach Alpha for each form was also computed (.80 to .85) and a factor analysis was made of the items common to all five forms.

The results further confirmed the existence of the three factors previously identified (principal components solution followed by varimax

rotations of the data) by analysis of a sample of fifth or eleventh graders in the schools of Pennsylvania.

In light of the findings, it was recommended that 19 of the original 28 EQA items for the fifth and eleventh grades be retained, that 14 new "school context" oriented items be added to supplement these items in measuring the three identified factors and, finally, that 13 items measuring attitudes toward learning independently of school context be included in the final version of the Goal IV instrument for the second grade (46 items in all).

The findings replicated the earlier finding that the Goal IV instruments seem to measure three factors: "Attitude Toward School Assignments," "Perception of the Learning Process," and "Perception of the School Climate." They also added a possible new dimension to the instrument by adding items unrelated to school or school learning, per se. In addition, the increased number of items based upon item analysis and factor loadings (general and specific) suggests that a substantial increase in reliability as well as validity may have been effected over the previous findings of .75 for the fifth grade instrument and .85 for the eleventh-grade instrument (Alpha coefficient).

Further work regarding validation and reliability of the instrument recommended here will be carried out in Fall 1971 and the results will hopefully be available at the time of presentation of this paper.

ATTITUDE TOWARD SCHOOL LEARNING: THE DEVELOPMENT OF A SEVENTH GRADE LEVEL INSTRUMENT FOR MEASUREMENT OF GOAL IV OF THE PENNSYLVANIA EDUCATIONAL QUALITY ASSESSMENT PROGRAM

Introduction

The Pennsylvania Department of Education has developed and is implementing a plan to assess the quality of education in the public schools of the Commonwealth (Campbell and Beers, 1970).

The concept of quality assessment in Pennsylvania had its beginning in Section 290.1 of Act 299 (August 8, 1963) of the State Legislature.

The act in question required the State Board of Education

> "To develop or cause to be developed an evaluation procedure designed to measure objectively the adequacy and efficiency of the educational programs offered by the public schools of the Commonwealth. The evaluation procedure to be developed shall include tests measuring the achievements and performance of students pursuing all of the various subjects and courses comprising the curricula. The evaluation procedure shall be so constructed and developed as to provide each school district with relevant comparative data to enable directors and administrators to more readily appraise the educational performance and to effectuate without delay the strengthening of the districts' educational program. Tests developed under the authority of this section to be administered to pupils shall be used for the purpose of providing a uniform evaluation of each school district and the other purposes set forth in this subdivision. The State Board of Education shall devise performance standards upon completion of the evaluation procedure required by this section."

In fulfillment of the provisions of this act, the State Board of Education, in consultation with the Governor's Citizen's Committee and the Educational Testing Service, adopted, in March 1965, the following 10 goals of quality education to serve as the basis for assessment and as the basis for the development of the programs.

I. Quality education should help every child acquire the greatest possible understanding of himself and an appreciation of his worthiness as a member of society.

II. Quality education should help every child acquire understanding and appreciation of persons belonging to social, cultural and ethnic groups different from his own.

III. Quality education should help every child acquire to the fullest extent possible for him, mastery of the basic skills in the use of words and numbers.

IV. Quality education should help every child acquire a positive attitude toward the learning process.

V. Quality education should help every child acquire the habits and attitudes associated with responsible citizenship.

VI. Quality education should help every child acquire good health habits and an understanding of the conditions necessary for the maintaining of physical and emotional well-being.

VII. Quality education should give every child opportunity and encouragement to be creative in one or more fields of endeavor.

VIII. Quality education should help every child understand the opportunities open to him for preparing himself for a productive life and should enable him to take full advantage of these opportunities.

IX. Quality education should help every child to understand and appreciate as much as he can of human achievement in the natural sciences, the social sciences, the humanities and the arts.

X. Quality education should help every child to prepare for a world of rapid change and unforseeable demands in which continuing education throughout his adult life should be a normal expectation.

The Bureau of Quality Assessment was then organized in June 1967 and given the task of translating the mandates of Act 299 and the wishes (Goals) of the State Board of Education into a working plan of assessment. Given the ten goals of quality education and the mandate to develop performance standards based on these goals, the bureau's first task was to develop measurement instruments appropriate to each goal.

For some goals, currently published standardized tests were found adequate. For the other goals, where no adequate measures existed, the bureau staff, along with staff from the Bureau of Educational Research, developed measures of potential usefulness at the fifth and eleventh grade level.

By April 1968, the measurement package was ready and was administered to 1,413 fifth-graders and to 1,285 eleventh graders throughout the state.

After making appropriate revisions, the revised instruments were administered to a stratified random cluster sample of schools. For grade 5 a total of 20,026 students in 353 schools responded to the measures and for grade 11 a total of 17,415 students in 73 schools responded. A total of 268 school districts were represented.

In the summer of 1970, the author of this paper was asked to review the findings for the Goal IV instruments designed for the fifth grade and eleventh grade, respectively, and attempt to create an instrument suitable for grade 7.

This new instrument was to be more reliable, if possible, and should attempt to measure other possible factors than the three factors already found for the existing instruments.

Goal IV had been redefined as follows:

> "Quality education should help every child acquire a positive attitude toward school and toward the learning process."

It consisted of an attitude measurement instrument designed to elicit statements of attitude toward school, toward the schooling process, toward teachers, etc.

It was found that the fifth grade instrument of 17 items developed by ETS and later revised by EQA yielded a Cronbach Alpha of 0.75 (Interval Consistency Reliability) and that a general principal component factor, "Interest in School," had factor loadings of at least .36 on each of the 17 items (Beers, 1970). See also Appendix A.

A varimax rotation of the results also yielded three meaningful factors (Beers, 1970). See also Appendix A.

Factor	Label	Variance Explained	Number of Items
1	Attitude Toward School Assignments	19%	7
2	Perception of the Learning Process	12%	5
3	Perception of the School Climate	15%	5
	Total variance explained =	46%	

The 28 items for grade 11 developed by ETS and later revised by EQA were found to yield a Cronbach Alpha reliability of 0.85. Factor analysis also resulted in a general factor (principal components) labeled "Interest in School" and all items loaded at least .47 on Factor I of the principal components solution (Beers, 1970). See also Appendix A.

Varimax rotation of the eleventh grade data yielded the same three factors, i.e., "Perception of the School Climate," "Attitude Toward School Assignments" and "Perception of the Learning Process." (Beers, 1970). See also Appendix A.

The "Perception of School Climate" factor was found to contain those items in which pupils express attitudes about teachers, about school buildings and about course offerings. This factor was reported to be the most clearly defined and as more strongly explaining the variances and covariances for the eleventh graders than for the fifth graders (Beers, 1970).

"School Climate"	Variance Explained	Number of Items
5th Grade	15%	5
11th Grade	25%	15

The "Attitude Toward School Assignments" factor was found to contain those items in which pupils express opinions about homework, reading, writing, studying and other class activities.

"School Assignments"	Variance Explained	Number of Items
5th Grade	19%	7
11th Grade	19%	14

Finally, the "Perception of the Learning Process" factor was found to contain those items in which the pupils expressed their opinions about teacher methods and school in general.

"Perception of Learning Process"	Variance Explained	Number of Items
5th Grade	12%	5
11th Grade	14%	8

The three factors were found to explain 46 per cent of the variance in grade 5 and 58 per cent in grade 11 (Beers, 1970).

Method for Devising Grade Seven Instrument

The findings for grade 5 and 7 were carefully examined to see what kinds of additional items might be added to the proposed grade 7 instrument.

It was found, for example, that only five items over both grade levels were highly loaded on the "Perception of the Learning Process" factor. Every attempt was therefore made to devise a number of possible new items measuring this factor along with some additional items designed to measure the other two factors identified earlier by Beers (Beers, 1970).

The author also noted that items on the grade 5 and 11 instruments of the "How important is it to you to" variety were primarily clustered in the factor "Attitude Toward School Work." This suggested that possibly this factor might be an artifact due to a common response mode and therefore it was decided to couch all of the proposed grade 7 items in one common response mode.

After some thought, a response mode requiring the respondent to choose between "almost always," "often," "sometimes," "seldom" and "almost never" was decided upon and appropriate variations upon those grade 11 and grade 5 items that deviated from this mode were devised. Any new items constructed were also designed to use this Likert-type response format.

At all points in the development of the experimental "grade 7" items and i ms, the proposed items were subjected to scrutiny and revision in the direction of simpler language and a lower reading difficulty level. Wherever the original EQA items seemed unduly difficult, a revision of wording was made, but every effort was made to minimize revision of these items for the sake of preserving continuity with the existing instrument.

In addition to trying to generate new items that would potentially expand the number of items measuring the factors identified earlier by EQA, it was also felt that items should also be generated that might conceivably measure a fourth "factor" that could be described as "Attitude Toward Learning Outside of the School Context" or as "Intrinsic Learning Motivation in all Contexts." Such hypothetical "Factor IV" items were therefore generated by the author for inclusion in the experimental versions of a Goal IV instrument designed for grade 7.

Since the final pool of new experimental and original EQA items was found to consist of some 140 items, it was not possible to administer all of the proposed items simultaneously to the same subjects.

As an alternative, five different experimental forms were prepared. Three forms had in common 22 of the original 28 EQA items.

These 22 items consisted of those items that loaded on the same factor in both the fifth grade and the eleventh grade samples obtained by EQA.

The first of the five forms, Form A, consisted of the original 28 EQA items plus 12 of the hypothetical "Factor IV" items developed by the author. The second form, Form B, consisted of the 22 EQA items held in common by three of the forms plus 21 items newly designed to measure the same three factors found in the original EQA items. Form C was similar to Form B in content, but it used a different set of "new" items along with the 22 original EQA items used in Form B.

Form IV-A, on the other hand, consisted primarily of 28 new items designed to measure the hypothesized "Factor IV" plus 11 of the most factorially strong of the original EQA items. The 28 new items in Form IV-A included the 12 "Attitude Toward Learning Outside of the School Context" items used in Form A. Form IV-B differed from Form IV-A only in that it substituted a different set of "Attitude Toward Learning Outside of the School Context" items.

These five forms (A, B, C, IV-A, IV-B) were then carefully inspected for unnecessarily difficult vocabulary. The Gunning FOG Index of Readability (Gunning, 1968) was used to estimate the level of reading difficulty for each of the forms. The aim of the author was to write items and directions at about three grade levels below the respondents' grade level, i.e., at about the level of a fourth grader. The computed readability grade levels of the five forms were as follows: 4.30 for Form A, 3.89 for Form B, 3.84 for Form C, 4.32 for Form IV-A and 4.58 for Form IV-B.

All forms, with the exception of IV-B, closely approximated the fourth grade level of reading difficulty and Form IV-B was at about the mid fourth grade level (4.58). These results were considered as satisfactory.

The five experimental forms were then randomly administered to 709 students from the two junior high schools of the Altoona, Pennsylvania school district. The population sampling was apparently quite good since the figure of 709 represents approximately 90 per cent of all seventh graders in the two schools with the respective schools contributing 431 and 382 subjects separately.

During the administration of the instrument, the pupils were instructed to write on the back of their booklets any word they did not know or the number of any item they did not understand. This information plus records of questions asked (kept by the monitors) enabled further item revision to be made in the final recommended instrument of 45 items. On the whole, no substantial number of respondents singled out any item as having a word they did not understand or as being difficult to understand as an item. Out of the five forms, only seven items were found to have been singled out by one or more per cent of the respondents and only three items had a "no response" rate of more than two per cent. Twenty-seven other items were above a "no response" rate of one per cent. Again these findings were deemed as satisfactory.

The obtained data was then compiled and subjected to statistical analysis using appropriate item analysis techniques (Likert items), Cronbach's Alpha for an interval consistency reliability estimate and principal components factor analysis with varimax rotation to obtain some knowledge of the factor structure.

Results

A. Original EQA Items

The reliability (internal consistency) of each of the experimental forms was determined by the use of Cronbach's Alpha, a generalized technique suitable to Likert-type items. The reliability coefficient for Form A was found to be 0.8105; for Form B, 0.8683; for Form C, 0.8552; for Form IV-A, 0.8518 and for Form IV-B, 0.8586. These findings indicate considerable consistency of response on the part of the subjects regardless of the type of items emphasized in a given form and compare favorably with the reliability coefficients of 0.75 and 0.85 obtained by EQA for grades 5 and 11, respectively (Toole, Campbell and Beers, 1970).

A principal component factor analysis (FANAL) was carried out for the items of each form. The findings suggest that there is a common underlying factor in each of the forms despite the addition of new and possibly weak items. The variance accounted for by "Factor I" of the principal components analysis was 14.14 per cent for Form A, 18.34 per cent for Form B, 17.45 per cent for Form C, 18.5 per cent for Form IV-A and 21.16 per cent for Form IV-B.

Since the number of subjects taking each of the five forms was about 160 and the number of items in each form was around 40, these results must be regarded as tentative, but also as in agreement with the author's expectations.

In order to see how the 22 original EQA items that are common to the first three forms (A, B and C) behaved factorially in their new settings, a principal component analysis (FANAL) was carried out followed by varimax rotation in which a solution calling for only two factors was derived, followed by a second solution calling for only three factors, followed by a third solution calling for only four factors and, finally, a fifth solution calling for five factors was derived.

This technique of iterated solutions calling for an increasing number of factors was suggested by a consultant to EQA, Dr. William W. Cooley. This method was previously used to derive the original three factors found in the grade 5 and grade 11 instruments.

Table I summarizes the "Factor I" findings for the various principal component analyses carried out on each of the forms and for the 22 items common to Forms A, B and C.

TABLE I

General Factor Loadings for EQA Items in Each Form and for Forms A, B and C Combined

Item	ABC	A	B	C	IV-A	IV-B
1	-	.39	-	-	-	-
2	.30	.39	.19	.32	.32	.15
3	.56	.41	.51	.52	.50	.47
4	.47	.37	.34	.39	.50	.54
5	-	.23	-	-	-	-
6	.41	.33	.32	.32	-	-
7	.37	.28	.31	.28	.49	.25
8	.45	.40	.38	.36	.37	.56
9	.29	*	*	*	-	-
10	.37	.41	.29	.53	-	-
11	-	-	-	-	-	-
12	.39	.45	.21	.48	.42	.52
13	-	.54	-	-	-	-
14	.52	.41	.44	.50	-	-
15	.43	.33	.43	.30	.44	.38
16	.38	.24	.34	.40	-	-
17	-	.33	.43	-	.35	-
18	.37	.34	.38	.26	.46	.32
19	.30	*	.36	.40	-	-
20	.24	.24	.17	.27	.37	.47
21	-	.50	-	-	-	-
22	.24	*	.31	.27	-	-
23	.19	.30	*	.22	-	-
24	.43	.25	.55	.49	-	-
25	.47	.38	.50	.45	-	-
26	.53	.51	.53	.55	-	-
27	.52	.41	.67	.44	-	-
28	.46	.42	.29	.41	-	-

*Not included in factor solution due to poor item analysis Likert t and r findings.

The findings for Forms A, B and C combined (ABC) are of particular interest since they alone have the sample size required by the rule of thumb that the size of the sample should be ten times the number of items in the correlation matrix, i.e., in this case, 10 X 22 or 220. The actual number of subjects for Forms A, B and C combined was 487, a more than sufficient figure.

For these 22 original EQA items the loadings are below 0.30 in only four instances and in one case is 0.29. These findings therefore strongly agree with the earlier findings of Beers (1970), where the loadings were all at or above 0.36 for grade 5, in that only five of the 22 items fell below this loading of 0.36.

It should be noted that, in a few instances, no factor loading is shown for Forms A, B or C although a loading is found for the combination of A, B and C. This is due to the fact that in the factor analysis of the separate forms some items were not included due to poor item analysis findings, i.e., low Likert "t" or "r" values.

It is, therefore, not coincidental that the ABC loadings for the items where an asterisk appears under A, B or C tend to be low since these items, on at least one of the three experimental measures, tended to have a low item to total score correlation (see Table II) and/or a low item to total Likert "t" (see Table III).

Based on inspection of the results in Tables I to III, the following items were recommended for possible deletion from the final official version of the Goal IV instrument to be used on the seventh-grade level.

Item 5 "How important is it to you to prepare for an exam or test?"

Form A loading = .23
Form A correlation = .20 (.01)
Form A "t" value = 3.20 (.01)

Item 9 "I like to begin a new topic in class."

Form ABC loading = .29
Form A correlation = .24 (.01)
Form A "t" value = 4.59 (.001)

Item 11 "I like to discuss my school work with a friend."

Form A correlation = .01
Form A "t" value = 0.84

TABLE II

Item to Total Correlations for the Original 28
Educational Quality Assessment Items

Item	(N-165) Form A	(N-163) Form B	(N-159) Form C	(N-160) Form IV-A	(N-161) Form IV-B
1	.31*				
2	.29*	.17**	.29*	.26*	.11
3	.32*	.46*	.47*	.43*	.43*
4	.26*	.30*	.35*	.41*	.49*
5	.20*				
6	.23*	.31*	.27*		
7	.22*	.26*	.23*	.43*	.22*
8	.31*	.36*	.32*	.31*	.50*
9	.24*				
10	.32*	.20*	.41*	.37*	.46*
11	.01				
12	.39*	.20*	.41*	.37*	.46*
13	.46*				
14	.32*	.40*	.43*		
15	.29*	.37*	.27*	.37*	.29*
16	.20*	.29*	.34*		
17	.11	.37*	.06	.29*	.19**
18	.29*	.35*	.23*	.41*	.27*
19	.06	.25*	.33*		
20	.21*	.16**	.23*	.33*	.40*
21	.37*				
22	.06	.25*	.22*		
23	.22*	.11	.19**	.07	.09
24	.22*	.47*	.42*		
25	.33*	.45*	.38*		
26	.44*	.46*	.49*		
27	.34*	.60*	.38*		
28	.35*	.25*	.34*		

* .01 level of significance
** .05 level of significance
Nonsignificant r's are underlined

TABLE III

Likert "t" Values for the Original 28
Educational Quality Assessment Items

Item	(N-165) Form A	(N-163) Form B	(N-159) Form C	(N-160) Form IV-A	(N-161) Form IV-B
1	3.81*				
2	4.05*	2.88**	3.55*	4.63*	2.51***
3	3.33*	5.33*	5.70*	6.03*	6.15*
4	4.65*	3.72*	4.25*	5.91*	7.34*
5	3.20**				
6	3.88*	3.43**	3.80*		
7	3.88*	3.68*	3.27**	5.09*	3.76*
8	4.92*	4.09*	4.04*	4.14*	6.91*
9	4.59*				
10	4.77*	4.82*	8.43*		
11	0.84				
12	4.17*	3.29*	5.54*	4.08*	7.36*
13	7.40*				
14	4.35*	5.66*	5.33*		
15	3.81*	3.76*	3.92*	5.14*	3.64*
16	3.78*	3.56*	5.73*		
17	1.69	3.92*	0.05	4.29*	1.90
18	2.67**	3.40*	2.76**	4.96*	3.20**
19	0.94	4.46*	3.94*		
20	2.56***	2.46***	4.28*	4.69*	5.97*
21	4.96*				
22	1.24	2.92**	2.69**		
23	3.94*	1.77	2.71**	0.84	1.23
24	4.12*	5.28*	4.83*		
25	5.68*	7.92*	4.87*		
26	7.06*	7.50*	7.68*		
27	6.09*	6.76*	4.64*		
28	4.20*	3.73*	3.77*		

* .001 level of significance
** .01 level of significance
*** .05 level of significance
Nonsignificant "t" values are underlined

Item 22 "It is hard to study in our school building."

Form ABC loading = .24
Form B loading = .31
Form C loading = .22
Form A correlation = .06
Form A "t" value = 1.24
Form B correlation = .25 (.01)
Form B "t" value = 2.92 (.01)
Form C correlation = .22 (.01)
Form C "t" value = 2.69 (.01)

Item 23 "Our classes take field trips."

Form ABC loading = .19
Form A loading = .30
Form C loading = .22
Form A correlation = .22 (.01)
Form A "t" value = 3.94 (.001)
Form B correlation = .11
Form B "t" value = 1.77
Form C correlation = .19 (.05)
Form C "t" value = 2.71 (.01)

Item 5 was rejected because its "t" and "r" item to total values and factor loading were considered as weak though significant statistically.

Item 9 was rejected because its factor loading was considered as low and its item to total statistics as doubtful at least.

Item 11 was rejected because its item to total statistics were quite low.

Item 22 was rejected because its factor loadings and item to total statistics were regarded as unsatisfactorily low though statistically significant in several cases.

Item 23 was rejected because its factor loadings and item to total statistics seemed weak despite being statistically significant in some instances. Also some institutions do not use field trips much and it was questionable to the author as to how this item really related to student attitude per se.

Varimax rotation of the ABC data on the 22 EQA items yielded results that closely paralleled the earlier findings of Beers (1970) regarding the factor structure of the fifth and seventh grade instruments. There was also, however, evidence of a possible fourth factor that was psychologically meaningful and worthy of consideration.

The first factor, accounting for 10.05 per cent of the variance, seemes to be identical with the previously identified factor labeled

"Attitude Toward School Assignments" since only one of the original items, "School is too much sitting," did not continue to load highly on this factor. This item instead loaded strongly on two other factors, but most highly in Factor II below.

The second factor that emerged seems to be equivalent to the "Perception of the Learning Process" factor identified by Beers (1970) and accounts for 7.43 per cent of the variance for the 22 EQA items in Forms A, B and C combined. Three of the six original items labeled as loading on this factor are found here.

The third factor, which seems identical to the original "Perception of the School Climate" factor, accounted for 10.98 per cent of the variance, but seems potentially separable into two separate factors, i.e., "Perception of School Climate" and "Perception of the School as a Positive Environment for Learning."

The second of these factors, the possible "new" factor, was labeled "Perception of the School as a Positive Environment for Learning" and accounted for 7.48 per cent of the total variance. A sample item loading above .40 on this factor (0.65) was:

"Our school building is nice to be in."

Consideration of the items in this "new" factor led to several observations. One item, "It is hard to study in our school building," is one that was found to be uniformly weak in terms of principal component analysis loading as well as in item to total statistics (Item 22 in Tables I to III) and had been recommended for rejection.

In addition, members of the Bureau of Educational Research staff, as well as the author of this paper, had expressed reservations about several of the original EQA items on the grounds that they were badly contaminated by possible confounding of attitude with physical facilities or physical environment.

The items questioned were:

1. Our school building is nice to be in.

2. It is hard to study in our school building.

3. Our classes take field trips.

4. Schools are good places to go when you need help.

It is interesting to note that of these four questionable items, three are also listed in the newly identified school-related factor. The only exception to this is "Our classes take field trips." This item loaded strongly on the "Perception of the Learning Process" factor but was considered to be questionable because some schools simply do not use field trips much, if at all. This seemed to be the case with the Altoona area students who frequently commented, "Our classes don't take field trips."

The above item may validly assess "Perception of the Learning Process" but it may also be reduced in meaningfulness by the question of whether the schools' use of field trips is often a more determiner than attitude toward school as toward learning per se.

It would seem then that this new factor, "Perception of the School as a Positive Environment for Learning," is badly confounded with school physical facilities or physical environment variables which should be measured separately.

The final decision then was to delete from the final form those items measuring this "new" factor along with the item "Our classes take field trips" in order to make the final instrument a purer measure of attitude against which school differences in physical facilities and physical environment can be correlated without contamination effects.

In sum, 19 of the original 28 EQA items were to be retained and nine deleted. Some seven of the 19 items were also to be modified as to wording in light of student comments on the items in question.

It was also suggested that the items be returned to their original response format with the exception of those that had required a "Yes" or "No" response. These items, couched in the present study's Likert format, seemed to be statistically superior compared with item statistic data based on the "yes-no" format.

B. New "Attitude Toward School and School Learning" Items

Since the sizes of the samples for each of the forms (B and C) did not warrant dependence on factor analysis data, the choice of school-related items to be included in the final form had to be based on the Likert item analysis data, i.e., upon the item to total correlation and the "t" for each item over all forms plus their "tentative" principal components loading.

Inspection of the items resulted in the selection of seven items from each form that had the highest principal components (Factor I) loadings, Likert item to total correlation and "t" values. This resulted in the addition of 14 items to the final recommended version of the grade 7 instrument.

Two of the recommended items, for example, were:

"School is a waste of time."

"Schools help to make this a better country."

C. New Items Measuring "Attitude Toward Learning Independent of School Context"

Since Forms IV-A and IV-B were heavily loaded with items that were designed to measure this hypothesized factor, it seemed reasonable to choose items whose principal components (Factor I) loadings were high and the item statistics favorable. Some examples of the type of items selected are:

"I wish that I could learn everything there is to know."

"I like games that make you think."

Concluding Statement

The final instrument as recommended to the Bureau of Educational Quality Assessment consisted of 19 former EQA items, 14 new "school context" items and the above 13 items designed to measure attitudes toward learning outside of a school context.

This instrument has recently been administered, by the Bureau of Educational Quality Assessment, to a large sample of students from a wide variety of schools. Preliminary findings available to the author indicate an obtained Cronbach Alpha coefficient of 0.96, but unfortunately, at the time this paper is being written no other data is available.

A factor analysis of the proposed instrument is apparently being undertaken along with further analysis of the difficulty of individual items (and vocabulary) for students at the lower range of achievement. Only such data can confirm whether the effort described in this paper has resulted in an instrument with the characteristics that were desired.

Hopefully, by the time of the presentation of this paper at the annual meeting of the American Education Research Association some results will then be available.

References

Beers, Joan S. Educational Quality Assessment Phase II Findings: Section 4, The Ten Goals of Quality Education--Rationale and Measurement. Harrisburg, Pa.: Pennsylvania Department of Education, 1970.

Campbell, Paul B. and Beers, Joan S. Educational Quality Assessment Phase II Findings: Section 1, The Pennsylvania Plan. Harrisburg, Pa.: Pennsylvania Department of Education, 1970.

Gunning, R. The Techniques of Clear Writing (Revised Edition). New York: McGraw-Hill, 1968.

Toole, Patrick F., Campbell, Paul B. and Beers, Joan S. Educational Quality Assessment Phase II Findings: Section 3, Reliability and Validity. Harrisburg, Pa.: Pennsylvania Department of Education, 1970.

Appendix A

Technical Properties of the Goal IV Instruments
for the Fifth and Eleventh Grade Measures
Developed by ETS and Revised by EQA

I. Grade 5 (17 Items)

Reliability

Coefficient alpha = .75

Item Analysis

Likert item to total correlations range from .22 to .42 for 15 of the 17 items. The remaining two items correlate .18 and .19 with the total score. All items discriminated significantly at the .01 level between the upper and lower 27 per cent on the total score.

Factor Analysis

Principal components--a general factor "Interest in School" with all items loading at least .36 on this factor.

Varimax rotation--three factors identified.

Factor	Label	Variance Explained	Number of Items
1	Attitude Toward School Assignments	19%	7
2	Perception of the Learning Process	12%	5
3	Perception of the School Climate	15%	5
	Total variance explained=	46%	

II. Grade 11

Reliability

Coefficient alpha = .85

Item Analysis

Likert item to total correlations are equal to or greater than .21 for 27 of the 28 items. The remaining item correlated .16 with the total score. All but one item discriminated significantly (.01 level) between the highest scoring 27 per cent and the lowest scoring 27 per cent.

Appendix A (continued)

Factor Analysis

Principal components--a general factor "Interest in School" with all items loading at least .47 on Factor 1 of the principal components solution.

Varimax rotation--three factors identified.

Factor	Label	Variance Explained	Number of Items
1	Perception of the School Climate	25%	15
2	Attitude Toward School Assignments	19%	14
3	Perception of the Learning Process	14%	8
	Total variance explained=	58%	

For both grades the same items tend to load on the same factors, but at grade 11 several items loaded substantially on two factors.